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Project Risk Management Strategies and Project Performance of the Telecommunication Industry, Ghana

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Abstract

The study examines the effect of project risk management strategies on project performance in Ghana's telecommunication industry. Specifically, the study examined the effect of risk assessment on project performance among the telecommunication firms, analysed the effect of risk control on project performance among the telecommunication firms, and assessed the effect of contingency planning on project performance among the telecommunication firms. The resource-based view underpinned the study. The study was purely quantitative, and the design was explanatory. Data was collected from 113 functional managers from the Ghana telecommunication industry. The analysis was done using multiple regression on SPSS version 25. The study found that risk assessment had a significant positive effect on project performance. The study found that risk control significantly and positively contributes to project performance. The study found that contingency planning significantly and positively contributes to project performance. Therefore, it was recommended that functional managers in the telecommunications sector should prioritise developing and implementing risk control measures and contingency plans.

Keywords: *Project Risk Management, Management Strategies, Project Performance, Telecommunication Industry*

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1.0 INTRODUCTION

The telecommunication industry in Ghana has experienced rapid growth and technological advancement in recent years, significantly contributing to the nation's economic development and connectivity. As this industry continues to evolve, project performance becomes crucial, as it directly influences the ability of telecommunication firms to deliver high-quality services, innovate, and maintain competitive advantages in a fast-paced market. Effective project performance is essential for meeting consumer demands, managing operational efficiencies, and achieving strategic objectives.

To enhance project performance, implementing robust project risk management strategies is imperative. These strategies, particularly risk assessment and control, enable organisations to identify potential risks early, assess their impact, and implement mitigation measures. By proactively managing risks, telecommunication firms can avoid project delays, cost overruns, and quality issues hindering overall performance. The relationship between project risk management and project performance can be further supported by the resource-based view (RBV), which emphasises the importance of leveraging internal resources and capabilities to achieve competitive advantage. In this context, effective risk management strategies allow organisations to utilise their resources more efficiently, enhance their operational capabilities,

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and ultimately improve project outcomes, leading to sustained performance in the competitive telecommunication landscape in Ghana.

1.1 Background to the Study

The telecommunication industry is instrumental in advancing multiple Sustainable Development Goals (SDGS), which are critical in establishing robust communication networks essential for economic growth and innovation. Specifically, it contributes to Goal 9 (Industry, Innovation, and Infrastructure) by facilitating the development of infrastructure that supports various economic activities (Bello & Othman, 2020; Kumi, Yeboah & Kumi, 2020). Additionally, the industry's role in supporting e-learning platforms and enabling remote access to educational resources directly contributes to Goal 4 (Quality Education), while also facilitating Goal 3 (Good Health and Well-being) by enabling telemedicine and healthcare information dissemination (Wickramasinghe & Razak, 2023).

As of 2019, the National Communications Authority (NCA) reported that the telecommunications sector in Ghana directly employed over 2,700 individuals and indirectly created more than 1.5 million jobs (NCA, 2020). The World Bank indicated that this sector contributed 5.5% to Ghana's GDP in 2019, amounting to US$2.7 billion, up from 4.9% in 2018 (World Bank, 2020). Ghana has six licensed mobile network operators: MTN Ghana, Vodafone Ghana, AirtelTigo, Glo Mobile Ghana, Expresso Telecom, and Telesol (NCA, 2020). The NCA also highlighted that the industry has attracted significant investment, with more than US$1.6 billion injected into the sector since 2010 (NCA, 2020).

Project performance is crucial in the telecommunications sector, as it directly influences the industry's ability to meet its operational objectives and align with these SDGS. Effective project performance encompasses various dimensions, including meeting deadlines, adhering to cost targets, and achieving desired quality outcomes. In a sector characterised by rapid technological advancements and competitive pressures, delivering projects successfully and efficiently is paramount for maintaining market share and driving innovation.

Implementing robust project risk management strategies, such as risk control and assessment, enhances project performance. Managing project risks effectively ensures that telecommunication projects are delivered on time, within budget, and to the required quality standards. Risk management strategies such as risk avoidance, reduction, transfer, and retention enable organisations to anticipate and mitigate potential challenges that could disrupt project execution (Wasswa *et al.,* 2020). For instance, conducting thorough risk assessments during the initiation phase allows project teams to identify potential issues early and implement strategies to minimise their impact on project outcomes.

The relationship between effective risk management practices and project performance can be supported by the resource-based view (RBV), which emphasises the importance of leveraging internal resources and capabilities to gain a competitive advantage (Wernerfelt,1989). By adopting effective risk management strategies, telecommunication firms can utilise their resources more efficiently and effectively, enhancing their operational capabilities and project outcomes. This perspective suggests that organisations that invest in building robust risk management competencies can better navigate uncertainties, capitalise on opportunities, and improve their overall project performance (Amar et al., 2022). As a result, effective project risk management becomes a tool for safeguarding projects and a strategic asset that contributes to sustained success in the dynamic telecommunication landscape in Ghana.

2.0 LITERATURE REVIEW

The literature review covered several key elements, providing a comprehensive foundation for the study. The theoretical review focused on the Resource-Based View (RBV), the underlying theory that framed the research. RBV was explored in detail to explain how a firm's internal resources contribute to project performance. Following this, the conceptual review clarified the

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study's central concepts, namely project risk management strategies and project performance. These concepts were elaborated to highlight their significance and interrelation within the research context. The empirical review synthesised findings from existing literature related to the three main objectives of the study. This review not only established the relevance of the objectives but also identified gaps in prior research, emphasising the need for further investigation. Finally, the conceptual framework was presented through a diagram that outlined the key hypotheses tested in the study. This framework visualised the relationships between project risk management strategies and project performance, grounded in the RBV theory.

2.1 Theoretical Review

2.1.1 Resource-based view (RBV)

The Resource-Based View (RBV) is a strategic management framework that emphasises the role of a firm's internal resources in achieving and sustaining competitive advantage. The central tenet of RBV is that firms possess unique resources and capabilities, which, if valuable, rare, inimitable, and non-substitutable (commonly referred to as the VRIN criteria), can provide a sustained competitive edge (Wernerfelt, 1989). These resources include tangible assets like technology and financial capital, and intangible assets like organisational culture, brand reputation, and intellectual property. The core idea is that firms can outperform their competitors by effectively leveraging these resources (Madhani, 2010).

RBV is grounded in several assumptions. First, it assumes resource heterogeneity, meaning that different firms within the same industry have varying resources, leading to firm performance disparities. Second, the theory assumes resource immobility, suggesting that valuable resources are difficult to transfer or replicate across firms, which further supports the persistence of competitive advantage. These assumptions highlight the importance of a firm's unique internal characteristics over external market conditions (Barney & Arikan, 2005).

However, RBV has faced several criticisms. One common critique is that it overlooks the role of the external environment and focuses too heavily on internal resources. Critics argue that market dynamics, industry trends, and competitive forces also play significant roles in determining firm success, but RBV downplays these factors (Bromiley & Fleming, 2002). Additionally, some have pointed out that RBV can be too static, failing to account for how resources evolve or how firms can adapt in rapidly changing environments (El Shafeey & Trott, 2014). Another criticism is the difficulty in operationalising the VRIN criteria, as measuring resources' value, rarity, and inimitability in practical terms can be challenging (Bertram & Bertram, 2016).

Despite these criticisms, RBV has been widely applied across various industries and disciplines. In business strategy, it is used to assess a firm's internal strengths and weaknesses, guiding decision-making on resource allocation, mergers and acquisitions, and innovation. RBV has been applied in project management to evaluate how firms can leverage their unique capabilities to improve project outcomes and achieve superior performance (Almarri & Gardiner, 2014). The framework has also found relevance in areas such as human resource management, where it helps firms understand how developing and retaining skilled employees can become a source of competitive advantage (Assensoh-Kodua, 2019). RBV remains a valuable lens for understanding how firms can build and sustain success through their unique internal resources.

According to the Resource-Based View (RBV), a firm's internal resources and capabilities are fundamental in achieving and sustaining a competitive advantage. In the context of telecommunication firms in Ghana, project risk management strategies—encompassing risk assessment, risk control, and contingency planning—are critical internal capabilities that can significantly enhance project performance. These strategies are valuable because they enable firms to proactively identify potential risks, mitigate their impact, and prepare for unforeseen events, thus ensuring smoother project execution and better outcomes.

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Risk assessment allows firms to identify and evaluate potential project threats systematically. By understanding the likelihood and impact of various risks, telecommunication companies can allocate resources more effectively and make informed decisions, aligning with RBV's emphasis on leveraging unique internal strengths. Risk control involves implementing measures to prevent or minimise the effects of identified risks. This proactive approach safeguards the project's objectives and contributes to operational efficiency, a resource that competitors may find hard to imitate. Contingency planning prepares firms for unexpected events by developing alternative strategies to keep projects on track. Adaptability and responsiveness to change are invaluable in Ghana's fast-paced and technologically evolving telecommunication industry. Contingency plans are a buffer against disruptions, ensuring that projects can continue despite challenges. This capability reflects the RBV principle that firms gain a competitive edge by possessing resources that are not easily replicated or substituted by others.

2.2 Conceptual Review

2.2.1 Project risk management strategies

Project risk management strategies are critical for ensuring the successful completion of projects, particularly in complex and dynamic industries such as telecommunications. Scholars have defined project risk management in various ways, emphasising different aspects of identifying, analysing, and responding to risks that could affect a project's objectives. According to Kerzner (2017), project risk management involves a systematic approach to managing uncertainty and minimising the adverse impacts of potential threats on a project's cost, schedule, and quality. Hillson (2019) extends this definition by noting that risk management is not solely about identifying negative risks (threats) but also about capitalising on positive risks (opportunities), thereby ensuring projects meet their intended goals.

Risk management strategies vary based on industry requirements and project complexity. Chapman and Ward (2011) emphasise that effective risk management should be integrated into every project phase, from the initial planning stages to completion. They argue that understanding the interdependencies between project risks allows for better preparation and mitigation efforts. Similarly, PMI's Project Management Body of Knowledge (PMBOK) suggests a process-oriented approach to risk management, which includes risk identification, qualitative and quantitative risk analysis, risk response planning, and risk monitoring and control. These frameworks highlight the importance of continuously assessing risks and updating management strategies as the project evolves.

For telecommunication firms in Ghana, the appropriate risk management strategies include risk control, risk assessment, and contingency planning, which are essential for addressing the industry's unique challenges. Risk assessment is the initial step where firms identify potential risks and evaluate their likelihood and potential impact. In the telecommunications sector, risks such as regulatory changes, technological failures, and market competition can have severe implications. By conducting thorough risk assessments, firms can prioritise risks and allocate resources effectively to mitigate them.

On the other hand, risk control focuses on the measures and actions taken to reduce the likelihood of risks occurring or minimise their impact. For telecommunication firms, this could involve deploying redundant systems to ensure continuous service in case of network failures or implementing strict cybersecurity protocols to protect against data breaches. Effective risk control strategies ensure that identified risks are actively managed throughout the project lifecycle (Leitch, 2016; Angelopoulos *et al.,* 2022; Pascarella *et al.,* 2021; Song, Martens & Vanhoucke, 2022).

Finally, contingency planning is crucial for telecommunication firms, as the industry is highly susceptible to unexpected events such as technological disruptions or changes in customer demand. A contingency plan outlines alternative courses of action that can be taken if identified risks materialise (Chen *et al.,* 2021). For example, a firm might prepare backup

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infrastructure in case of a system crash or develop alternative project timelines to address delays in equipment delivery. Contingency planning ensures that telecommunication firms are prepared for known risks and have strategies in place to deal with unforeseen circumstances.

In conclusion, for telecommunication firms in Ghana, adopting a comprehensive risk management approach that includes risk assessment, risk control, and contingency planning is essential for improving project performance and maintaining a competitive edge in a fast-paced and evolving industry. These strategies help firms navigate the complexities and uncertainties that characterise telecommunications projects, ensuring they meet their objectives while mitigating potential threats.

2.2.2 Project Performance

Project performance is a multifaceted concept defined by various scholars, offering distinct perspectives on what constitutes successful project outcomes. According to Atkinson (1999), project performance is traditionally measured through the "Iron Triangle," which considers three key dimensions: time, cost, and quality. A project is deemed successful if it is completed on schedule, within budget, and meets the specified quality standards. However, this definition has evolved as scholars began recognising that project performance extends beyond these basic criteria. Turner and Müller (2005) argue that project performance should include stakeholder satisfaction and alignment with broader strategic goals. They emphasise that meeting the expectations of clients, end-users, and project sponsors is equally critical in determining whether a project has succeeded.

Baccarini (1999) also contributes to this discussion by differentiating between project management success and project product success. He explains that while adequate time, cost, and quality management may indicate good project management, the ultimate measure of project performance is successfully delivering the project's intended outcomes or benefits. In this sense, a project may meet the traditional "Iron Triangle" criteria but fail if it does not deliver the expected value to the organisation or stakeholders. This broader view has shifted how organisations assess project performance, incorporating factors like customer satisfaction, return on investment, and the long-term sustainability of the project's outputs.

What constitutes project performance can vary depending on the context and the industry. Several scholars have highlighted different dimensions to consider when evaluating project success. Shenhar *et al.* (2001) propose a multidimensional approach that includes efficiency (time and budget), impact on the customer (satisfaction and use of the project's output), business success (impact on the organisation), and preparing for the future (long-term organisational benefits). These dimensions acknowledge that project performance is not just about the immediate completion of tasks but also about how the project contributes to the organisation's long-term strategic objectives.

In the context of telecommunication firms in Ghana, project performance is similarly multi-dimensional, with specific considerations relevant to the industry. Telecommunication firms operate in a fast-changing and highly competitive environment, where technological innovation, regulatory compliance, and customer service quality play crucial roles. For these firms, project performance is about completing projects on time and within budget and delivering innovative solutions that meet market demands and regulatory standards. Quality of service, especially in terms of network reliability, data security, and customer support, is a key measure of success.

Furthermore, the performance of telecommunication projects in Ghana is heavily influenced by the firm's ability to adapt to new technologies and infrastructure developments. Projects that enhance network coverage, increase data transmission speeds, or introduce new services like 5G connectivity are successful when they improve customer experience and market competitiveness. Additionally, projects that contribute to operational efficiency, such as upgrading infrastructure to reduce downtime or implementing cost-effective technologies, are

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highly valued in this sector. Therefore, the project performance of telecommunication firms in Ghana encompasses not only traditional measures like time, cost, and quality but also innovation, regulatory adherence, customer satisfaction, and technological advancement.

2.3 Empirical Review

2.3.1 Risk assessment and project performance

Erfani *et al.* (2023) conducted a study investigating the quality of early risk registers and assessments in large transportation projects, focusing on how well these early risk predictions aligned with the actual risks that materialised during project execution. The study employed textual analysis of archival risk register documents, utilising finite-state automation methods similar to Markov chain models to track changes in risk attributes over time. This approach allowed the researchers to monitor how risks evolved as projects progressed and provided insights into how project teams could better anticipate and adjust to these changes. The primary objective was to enhance forecasting capabilities and improve the alignment of risk registers from the initial planning phase (ex-ante) to the post-completion phase (ex-post).

Based on data from 11 major U.S. transportation projects, the study's findings revealed that fewer than 65% of the risks identified at the outset of the projects (ex-ante) occurred and were mitigated during execution. Conversely, over 35% of the identified risks did not materialise and were subsequently retired. More than half of the risks that impacted the projects emerged during project execution as new information became available. This underscores the dynamic nature of risk in large infrastructure projects and highlights that early risk identification alone is insufficient to guarantee successful project delivery. The researchers also noted that project teams with a proactive and adaptive risk management style—"positive doer behaviour," which involves actively monitoring and identifying new risks as they arise—were more successful in delivering projects on time and within budget.

While the study makes important contributions by emphasising the project risks' dynamic and evolving nature, it also invites criticism. One potential limitation is its reliance on historical risk registers and finite-state automation models, which may oversimplify the complexity of real-world project environments. Although the use of Markov chain models helps track changes in risk attributes, the study could benefit from a more nuanced approach that incorporates other factors, such as stakeholder influence, political or regulatory shifts, and environmental uncertainties, which are not always captured in a purely statistical analysis. Additionally, while the study's findings underscore the importance of active risk management during project execution, it does not fully address the challenges of implementing such adaptive behaviour in practice, particularly in large, bureaucratic organisations where decision-making processes may be slow or risk-averse. Nevertheless, the study offers valuable insights into improving risk management practices and enhancing project performance through continuous risk assessment and adaptation.

Sanni-Anibire *et al.* (2020) conducted a study to develop a risk assessment approach to improve the safety performance of construction projects. The study utilised pair-wise comparisons and a weighting-by-ranking survey method to establish risk scores and weights for construction accidents and their associated causes. Data was gathered from safety professionals working on 15 large construction sites in the Eastern Province of Saudi Arabia. The findings revealed that "falling objects" represented the accident type with the highest risk score, and the most significant cause of such accidents was excessive wind on project sites. The developed risk assessment approach was applied to an ongoing car park construction project, where it was found that accidents related to slips, trips, and falls exhibited the best safety performance. Moreover, when evaluating the project's overall safety using the Six Sigma framework, the performance was rated at 2.33 sigma, meaning that approximately 228,739 accidents could occur for every million opportunities.

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The study provides a practical framework for assessing and mitigating safety risks in construction projects. By collecting data directly from safety professionals in the field and focusing on a range of potential hazards, the research offers a grounded and context-specific analysis of safety risks. Using pair-wise comparisons and ranking surveys adds rigour to the assessment, allowing for a clearer understanding of how different risks should be prioritised in a high-risk environment like construction. The Six Sigma evaluation adds further value by offering a quantifiable measure of safety performance that can help project managers systematically assess their safety standards.

However, the study also has some limitations. While it identifies excessive wind as the leading cause of "falling objects," the research could benefit from a deeper exploration of other contributing environmental or operational factors that may influence this risk, such as poor material handling or inadequate site supervision. Furthermore, the application of Six Sigma—while valuable for quantifying safety performance—could be seen as overly technical and might not capture the nuances of day-to-day safety practices on construction sites, which often involve human factors that are difficult to measure statistically. Lastly, the study's focus on large construction sites in a specific region (the Eastern Province of Saudi Arabia) may limit the generalizability of its findings to other contexts, particularly smaller projects or those in different geographic areas where safety risks and causes may vary.

Mutunga and Ondara (2021) conducted a study to determine the effect of risk identification, reporting, risk analysis, and risk control on project performance at the Kenya Airport Authority (KAA). The study was grounded in systems theory, goal orientation, and contingency theory to provide a strong theoretical foundation. A descriptive research design was employed, and the study targeted a population of 281 staff members from KAA's project board division, which had been managing various projects over the past five years. A sample of 141 staff members was selected for analysis from this population. The research relied on primary data collected through questionnaires, and both inferential and descriptive statistics, particularly multiple regression analysis, were used to analyse the data. Ethical considerations were also adhered to throughout the study. The findings revealed that risk identification had a significant positive impact on project performance at KAA. Similarly, risk reporting and risk analysis significantly affect project performance, suggesting that proactive risk management practices are essential for improving organisational project outcomes.

While the study provides valuable insights into the importance of risk management in enhancing project performance, it has some limitations. One critique is the relatively narrow focus on the Kenya Airport Authority, which may limit the generalizability of the findings to other industries or organisations. Although adequate for the population, the sample size could be expanded to include a broader range of stakeholders involved in KAA's projects to obtain a more comprehensive view of how risk management practices are applied. Additionally, while the study relies on multiple regression analysis to determine the relationships between risk management practices and project performance, qualitative data could have added more depth to the findings by exploring the reasons behind these relationships. Finally, the study could benefit from a more detailed discussion on the potential challenges and barriers to implementing effective risk management practices in large, complex organisations like KAA.

Kurniawan and Rahman (2020) conducted a study to identify critical risk factors (CRFs) that impact building projects in West Sumatra, explicitly focusing on their influence on contractors. The research sought to assess these risk factors during the construction phase of various projects in the province. The respondents included contractors, supervisors, and owners, with data collected through random sampling via structured questionnaires. The collected data were analysed statistically using Partial Least Squares-Structural Equation Modelling (PLS-SEM) with the Smartpls 3.0 software. The findings revealed that the most critical risks affecting project performance were project management risk, material risk, design and architectural risk, equipment risk, and safety risk.

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While the study effectively identifies significant risks that can impact construction projects, it has some limitations. One critique is that the reliance on structured questionnaires may restrict the depth of understanding regarding the complexities and interrelationships of these risks. Including qualitative methods, such as interviews or focus group discussions, could have provided richer insights into the underlying causes and implications of the identified risks. Additionally, the focus on West Sumatra may limit the generalizability of the findings to other regions or types of construction projects, as different geographic areas may face unique challenges. Lastly, while the study lists critical risk factors, it does not explore strategies for mitigating these risks, which could have provided valuable recommendations for practitioners in the field.

Akintunde and Morel (2023) conducted research to evaluate the impact of risk management practices in the Nigerian construction industry, with a particular focus on identifying common risk factors that significantly influence project performance. The study aimed to understand the current status of risk management and its relationship with project performance, investigate the risk management practices currently adopted within the Nigerian construction sector, and explore the perceptions of project managers and other stakeholders regarding the effectiveness of these practices. Employing a quantitative systematic review approach, the research analysed relevant literature from the past decade. Key factors examined included inflation and price fluctuations, inadequate financial resources, inconsistencies in government policies, extortions by local groups, and changes in building design scope initiated by clients.

While the study provides valuable insights into the current state of risk management in Nigeria's construction sector, it has certain limitations. One critique is the reliance on literature review alone, which may overlook practical, on-the-ground experiences and challenges faced by practitioners in the industry. Including qualitative data through interviews or surveys could have enriched the findings by capturing the nuanced perspectives of those directly involved in construction projects. Additionally, while the study identifies significant risk factors, it does not delve deeply into the underlying causes of these risks, nor does it explore their interrelationships, which could offer a more comprehensive understanding of the risk landscape. Furthermore, while the recommendations for training stakeholders, vocational training for artisans, and establishing regional risk managers are commendable, the research could benefit from a more detailed action plan outlining how to implement these recommendations effectively.

2.3.2 Risk control and project performance

Mutunga and Ondara (2021) conducted a study to assess the impact of risk management tools on the performance of projects at the Kenya Airport Authority (KAA). Specifically, the study examined how risk identification, risk reporting, risk analysis, and risk control influenced project performance. The research was supported by systems theory, goal orientation, and contingency theories, providing a solid theoretical foundation. A descriptive research design targeted 281 staff members from KAA's project board division, who had managed various projects over the past five years. A sample of 141 staff members was selected for participation from this population. Primary data was collected through questionnaires, and the analysis was conducted using inferential and descriptive statistics, with multiple regression analysis as the primary tool. Ethical considerations were fully adhered to throughout the study. The results showed that risk control, alongside risk identification, reporting, and analysis, played a significant role in predicting project performance at KAA, reinforcing the importance of proactive risk management in achieving successful project outcomes.

While the study offers valuable insights into how specific risk management tools affect project performance, it has certain limitations. One critique is the reliance solely on quantitative data collected through questionnaires, which may not capture the complexities and nuances of risk management practices within a large organisation like KAA. Using qualitative data—such as

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interviews or focus groups—could have provided a more in-depth understanding of how these risk management tools are applied in practice. Additionally, the study's focus on KAA may limit the broader applicability of the findings to other sectors or contexts, as risk management challenges may differ across industries. Lastly, the study could have explored the potential barriers to implementing effective risk control measures, offering more practical insights for organisations looking to improve their risk management practices.

Obondi (2022) conducted a study to explore the relationship between project risk monitoring and control practices and project success in construction projects across the United States. An electronic survey was distributed to a sample of 50 construction project managers in the Dallas-Fort Worth area of Texas to gather data. The study employed Spearman rho correlation analysis to assess the connection between implementing risk monitoring and control practices and the overall success of projects. The findings revealed that all examined practices—such as risk reassessment, risk audits, contingency reserves analysis, and risk status meetings—were significantly and positively associated with project success in the construction sector.

While the study provides valuable insights into the importance of risk monitoring and control in achieving successful construction projects, it has some limitations. One critique is the relatively small sample size of 50 project managers, which may affect the reliability and generalizability of the findings. A larger and more diverse sample could yield more robust conclusions and insights applicable across various contexts and project types. Additionally, the study relies solely on quantitative data, which may overlook qualitative aspects of risk management that can influence project success, such as the attitudes and behaviours of project managers in implementing these practices. Furthermore, the research does not explore the mechanisms through which risk monitoring and control practices impact project success, leaving a gap in understanding the underlying processes involved.

Adafin, Rotimi and Wilkinson (2021) conducted a study to identify the risk-influencing factors that affect budgetary performance during the design development phase of construction projects. The researchers utilised a literature review to pinpoint the factors influencing project budgets, which informed the design of an online questionnaire survey. The survey was distributed to 64 practising project managers (PMS) in New Zealand, and their responses were analysed using various statistical methods, including descriptive statistics, mean ranking analysis, degree-of-risk measurement, and correlational analysis. This approach allowed the researchers to rank and determine the top five risk factors contributing to variability in budget performance. The analysis identified significant risk factors such as changes in project owner or stakeholder requirements, the experience of the project team, site condition information, consultant competency, and the quality of information flow.

While the study successfully identifies critical risk factors affecting project budget performance, it has some limitations. One critique is the relatively small sample size of 64 project managers, which may limit the generalizability of the findings to the broader construction industry. A larger sample could provide a more comprehensive understanding of the risks faced across different projects and regions. Additionally, relying on self-reported data from project managers may introduce bias, as their perceptions of risk factors may not always align with actual project outcomes. Furthermore, while the study employs a range of statistical analyses to assess risk factors, it could benefit from incorporating qualitative insights, such as interviews or focus groups, to capture the nuances of how these risks manifest in practice.

Su and Khallaf (2022) conducted a systematic review to identify and analyse existing research on the influence of risk on project performance. They reviewed 54 relevant articles, categorising them into three distinct groups based on their research content. The study thoroughly examined the contents and methodologies used in each article, identifying the 13 most frequently employed research methods. The findings indicated that much existing literature has focused on developing tools and approaches to assess how risks affect project performance.

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Common themes included identifying risk factors, modelling risk interdependencies, investigating the causes of poor project performance, evaluating the impact of risks on cost contingencies, discussing risk response strategies, and analysing how high-risk projects can generate substantial returns. However, the authors identified four critical gaps in the current research landscape: the need for improved accuracy in quantitative studies regarding the influence of risk on project performance, the necessity for novel research methodologies to conduct more precise risk influence assessments, the importance of considering the decision-making processes of project participants in research, and the development of a comprehensive framework that views risk influence assessment as a systemic whole.

While the review provides a comprehensive overview of the state of research in this area, it has some limitations. One critique is that while identifying gaps is helpful, the authors do not offer specific recommendations or strategies for addressing these gaps. Additionally, the systematic review could benefit from a more detailed analysis of the methodologies employed in the reviewed studies, enhancing understanding of how different approaches may impact the findings. Furthermore, the reliance on existing literature may overlook emerging trends or innovative practices that have not yet been widely documented, thus limiting the scope of the review.

Rahman and Adnan (2020) aimed to analyse risk management (RM) and risk management performance measurement (RMPM) through an in-depth empirical examination of two complex construction projects in Finland. To achieve this objective, the authors employed a qualitative case study approach to identify the RM processes involved and the major and minor risks associated with the projects. Additionally, the study explored the RM strategies implemented to mitigate these risks and the performance measurement strategies used to evaluate RM effectiveness.

While the study provides valuable insights into RM and RMPM within the context of complex construction projects, it has certain limitations. One critique is that the focus on only two case studies may limit the generalizability of the findings to other projects or contexts. A broader sample could provide a more comprehensive understanding of RM practices across different types of construction projects. Furthermore, while qualitative case studies help explore complex phenomena in depth, they may not capture the full range of quantitative data that could enhance the analysis. The study could also benefit from a discussion of the implications of its findings for practice and policy, as well as recommendations for improving RM processes based on the results.

Ouma, Sang and Kinoti (2020) conducted a study to explore the relationship between risk management and information technology project performance within Kenyan commercial banks, while also considering the moderating effect of project complexity and the mediating effect of risk culture—factors that had been largely neglected in prior research. The study targeted a population of forty projects from Kenyan commercial banks, employing stratified and simple random sampling techniques to gather data. Questionnaires were distributed to 108 respondents, with the instrument's reliability assessed using Cronbach's alpha coefficient and its validity established through reviews by selected IT project professionals. The researchers used a drop-and-pick method for questionnaire administration, allowing respondents adequate time to complete them and offering online responses. The research utilised both descriptive and explanatory analysis designs, employing multiple regression analysis to investigate the association between risk analysis and the performance of IT projects. The data was analysed using SPSS Version 25, with diagnostic tests for normality, linearity, homoscedasticity, and multicollinearity performed to ensure compliance with the assumptions of linear regression. The results revealed that risk analysis significantly impacted the performance of IT projects in the banking sector.

While the study provides valuable insights into the role of risk management in enhancing project performance, it has some limitations. One critique is the reliance on self-reported data

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from respondents, which may introduce bias and affect the reliability of the findings. Additionally, the study's focus on only Kenyan commercial banks may limit the generalizability of the results to other contexts or sectors. While appropriate for exploratory analysis, the choice of research design may not fully capture the complexities of risk management practices across various project types. Furthermore, while the study highlights significant relationships, it would benefit from a deeper exploration of the underlying mechanisms through which risk management and risk culture influence project outcomes.

2.3.3 Contingency planning and project performance

Hoseini *et al.* (2020) examine cost performance and cost contingency during the execution phase of projects from the perspectives of both clients and contractors. Utilising a case study methodology, the researchers investigated 95 projects associated with clients and 51 with contractors. The findings reveal that the perceived cost performance varies significantly depending on the perspective taken. From the client's viewpoint, projects showed an average cost underrun of approximately 16%, while the contractor's average cost overrun was about 2%. Furthermore, on average, clients' estimated cost contingencies were 2.64% higher than what was ultimately required, whereas contractors' estimated contingencies fell short by an average of 5.41%. The researchers attribute these discrepancies to biases; clients exhibit a pessimistic bias alongside technical factors, while contractors display an optimistic bias, influenced by technical and political motivations that may lead to opportunistic behaviour. These insights can aid practitioners in refining their cost estimation processes by being aware of and mitigating both pessimistic and optimistic biases, such as relying on historical project data.

While this research provides significant insights into the factors influencing cost performance from different stakeholder perspectives, it has some limitations. One critique is the reliance on a case study approach, which may limit the generalizability of the findings across various industries or project types. Additionally, while the study identifies biases as contributing factors to cost discrepancies, it does not delve into how these biases can be practically addressed beyond suggesting historical data. A more detailed exploration of specific strategies for overcoming these biases would enhance the study's applicability.

Persson and Granberg (2021) explore the intersection of collaborative public management (CPM) and crisis management (CM) within the context of collaborative crisis management, particularly focusing on large-scale societal challenges. Their study investigates an in-depth case of contingency planning for the risk of dam failure in a significant river basin in central Sweden, characterised by high uncertainty and potentially cascading impacts on society. The researchers identify shortcomings in the reach of collaboration, which could hinder capacity building and preparedness, ultimately increasing vulnerability during a crisis. They observe that contingency planning was approached as a finite project with a defined start and end rather than an ongoing process. This perspective contradicts fundamental principles of adequate contingency planning. The authors emphasise the importance of recognising varying levels of organisational capacity and fostering continuous awareness among the involved organisations and actors. The findings highlight the inherent complexities of cross-sector collaboration and contingency planning.

While this article offers critical insights into the dynamics of collaborative crisis management, it has limitations. One critique is the focus on a single case study, which may restrict the generalizability of the findings to other contexts or crisis scenarios. Additionally, while the authors identify the need for continuous processes and awareness, they do not provide concrete strategies or frameworks for improving collaboration and preparedness in contingency planning. A deeper exploration of practical approaches to enhance organisational capacity and ongoing collaboration would strengthen the study's applicability.

Maniar (2020) investigates the challenges and effectiveness of contingency management in addressing cost overruns within Indian construction companies. Employing a quantitative methodology, the study gathered data through structured questionnaires from 100 out of 335

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surveyed companies, achieving a response rate of 29.85%. Additionally, it analysed archival data from 50 construction projects completed between 2014 and 2019. The analysis utilised simple statistical tools, including the Relative Importance Index (RII), mean scores, standard deviations, and ranking methods, to yield results aligned with the research objectives. The findings indicate that 60% of Indian construction companies rely on the traditional percentage method for determining contingency sums, a subjective approach rooted in historical project performance, which the study suggests may be insufficient for effectively mitigating cost overruns. Archival analysis revealed that contingency measures only effectively addressed cost overruns in 9 out of the 50 projects analysed (18%). Furthermore, the study highlights that unplanned contingencies, with vague forecasting strategies, were often used.

While Maniar's study offers valuable insights into contingency management in the Indian construction sector, it has several limitations. The relatively low response rate may compromise the sample's representativeness, and the reliance on self-reported data could introduce bias. Additionally, while the study identifies critical issues in contingency practices, it lacks an in-depth exploration of the reasons for the unplanned use of contingencies and vague forecasting strategies. Recommendations for more robust contingency planning frameworks or practices could enhance its applicability.

Chaib Lababidi *et al.* (2020) examine the relationship between strategic planning and organisational performance, addressing the inconsistencies noted in previous research. They argue that earlier studies have often overlooked the impact of contextual variables on this relationship, primarily focusing on direct effects. To explore this, the authors employ contingency theory and propose six hypotheses that posit a positive correlation between strategic planning and organisational performance, contingent upon aligning two contextual factors: organisational structure and environmental uncertainty. Data was gathered from senior executives and managers involved in strategy formulation across enterprises in the United Arab Emirates (UAE) and analysed using multiple regression analysis with moderated moderation techniques. The results validated all six hypotheses, reinforcing the study's assertion that a holistic, multivariate fit approach grounded in contingency theory can better understand the strategic planning-performance nexus within the UAE context.

While the study contributes significantly to understanding the strategic planning-performance relationship, it also has some limitations. The focus on a single geographic region—the UAE—may limit the generalizability of the findings to other contexts. Furthermore, while the study identifies important contextual variables, it does not delve into how organisational structure and environmental uncertainty interact with strategic planning. This could be explored in future research to enhance understanding. In summary, Chaib Lababidi *et al.'s research highlights the necessity of considering contextual factors in examining the relationship between strategic planning and organisational* performance, suggesting that alignment between these factors is critical for achieving positive outcomes. However, broader studies across diverse settings could strengthen the conclusions drawn.

Hoseini, Bosch-Rekveldt, and Hertogh (2020) highlight a notable gap in the literature regarding the evolution of total project cost estimates during the preconstruction phase of construction projects. While previous studies have focused on methods for estimating costs and differentiating between "known unknowns" and "unknown unknowns" contingencies, there has been limited investigation into how these contingencies impact actual cost estimations in real-world projects. Responding to a practice-based demand for better insights into cost estimation development, the authors conducted a case study of 29 Dutch flood defence projects. Their findings revealed an average 11.51% increase in estimated costs compared to initial forecasts, a figure lower than prior studies reported. This increase was attributed to "technical" reasons rather than miscalculations.

The study also examined the dynamics of "known unknowns" and "unknown unknowns," finding that the proportion of "unknown unknowns" contingencies had risen during the

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preconstruction phase, contrary to expectations of a decrease. This suggests a lack of confidence in the accuracy of cost estimates, potentially stemming from insufficient experience, organisational culture issues, or a tendency towards "pessimistic bias." While the research offers valuable insights into cost estimation practices, it could benefit from a broader sample that includes various projects beyond flood defence. Further exploring the factors leading to the observed increase in "unknown unknowns" would also enhance understanding of the underlying causes. Overall, the study underscores the need for greater awareness and improved methodologies for cost estimation in the preconstruction phase, emphasising that organisations should address their cultural and experiential shortcomings to enhance confidence in their estimations.

Jariwala (2024) examines the critical importance of contingency planning in contemporary business environments characterised by rapid technological changes and geopolitical uncertainties. The paper emphasises that contingency planning differs fundamentally from business continuity, with the former focusing on proactive measures to anticipate and address potential disruptions. It outlines various forms of scenario planning—predictive, explorative, normative, and strategic—each providing different insights ranging from extrapolating current trends to developing long-term visions.

The study highlights key factors for the successful implementation of contingency plans, including the necessity for regular reviews and adaptability to changing circumstances. Additionally, it details the significant advantages of adequate contingency planning, such as risk reduction, improved resource management, and increased stakeholder confidence. While the paper provides a comprehensive overview of contingency planning's significance and methodologies, it could enhance its practical applicability by including case studies or real-world examples that illustrate successful implementation. Furthermore, addressing potential challenges organisations may face in developing and executing these plans would provide a more balanced perspective. Overall, Jariwala's research effectively underscores the value of contingency planning as a strategic tool for businesses navigating an unpredictable landscape.

2.4 Conceptual Framework

Figure 1 presents the conceptual framework for this study. The framework depicts the various relationships and hypotheses that were tested in the study. The dependent variable was the project performance of telecommunications firms in Ghana, and the independent variables were risk assessment, risk control, and contingency planning (project risk management strategies).

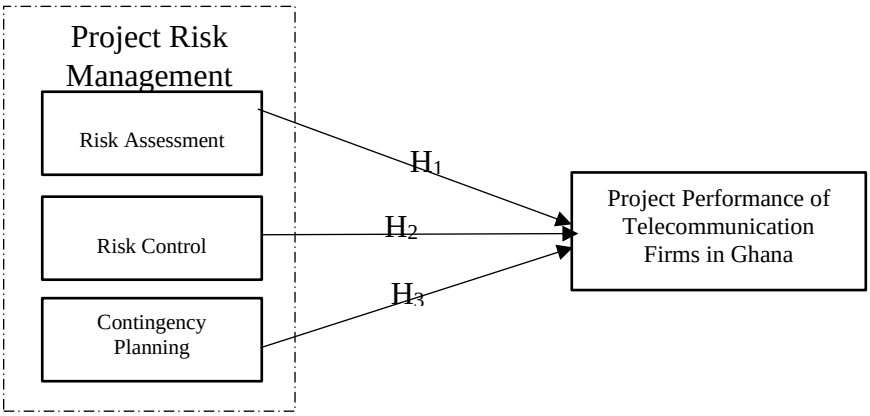

Figure 1. Conceptual framework
Source: Researcher creation (2024)

The framework in the figure showed that the study had three research hypotheses. The first hypothesis (H_1) was to test whether risk assessment significantly affected the project

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performance of telecommunication firms in Ghana. The second hypothesis (H_2) was to test if risk control significantly affected the project performance of telecommunication firms in Ghana. Moreover, the last hypothesis (H_3) was to test if contingency planning significantly affected the project performance of telecommunication firms in Ghana.

2.4 Chapter Summary

This chapter established the resource-based view as the study's theoretical foundation, emphasising its relevance to understanding project risk management strategies and their impact on project performance. A comprehensive empirical review focused on key components such as risk assessment, risk control, and contingency planning, all playing critical roles in enhancing project outcomes. The review highlighted the importance of these strategies in mitigating risks and maximising project success. Furthermore, the chapter presented a conceptual framework that delineates the interrelationships between these variables. This framework served as a basis for testing three hypotheses, illustrating how effective risk management strategies can improve project performance. This chapter provides a robust foundation for the study by integrating theoretical perspectives with empirical findings. It enhances understanding how resource-based principles can be applied to project risk management. The insights gained from this chapter set the stage for further exploration and validation of the proposed hypotheses in subsequent research.

3.0 RESEARCH METHODS

This chapter outlines the study's methodology, detailing the research approach and design tailored to the objectives and questions. It identifies the study population, specifying the sample size and the sampling technique employed for participant selection. The chapter describes the data collection methods, including the instruments and procedures to gather information effectively. It also addresses data processing and analysis, highlighting the statistical techniques utilised to interpret the findings accurately. Additionally, the chapter emphasises the importance of ensuring validity and reliability in the research and the ethical considerations taken to protect participants' rights and welfare throughout the process. This chapter establishes a comprehensive framework for the research methodology, ensuring rigour and transparency in the study.

3.1 Research Approach

A research approach is a study procedure or plan that incorporates everything from general assumptions to specific collection of data, analysis, and discussion (Creswell & Creswell, 2017, 2020). Considering the objectives of the study, the quantitative research approach was used. This approach identifies the variables to study and allows for objectively testing hypotheses and analysis by statistical procedures such as descriptive and inferential statistics using closed-ended and predetermined questions (Creswell, 2009). The quantitative approach allows using quantitative tools such as inferential and descriptive statistics to describe critical issues in the study (Hoover & Donovan, 2008), and using standards of validity and reliability. As a result, a quantitative approach was employed in the study because it sought to examine a relationship based on numbers and figures, necessitating using quantitative tools such as regression.

3.2 Research Design

The study utilized the explanatory research design based on the quantitative approach. Explanatory research is characterized by the testing hypothesis that specifies the nature of the relationship amongst variables. Also, it deals with the causes and effects through testing of hypothesis to help understand the problem efficiently. The purpose of an explanatory design is to increase the understanding of a phenomenon by providing detailed information. It provides the flexibility in accessing sources such as published articles and gaining new insights on the occurrence and generalization of findings (Creswell & Creswell, 2017).

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3.3 Population

The study population consisted of functional managers representing a range of sectors within Ghana's telecommunications industry. These sectors included application service providers, content providers, network equipment suppliers, software and cybersecurity service providers, system integrators, terminal suppliers, and distributors. The accessible population for the study comprised 120 functional managers from major telecommunications companies, including MTN, Telecel, and AirtelTigo (Human Resource Unit, 2024). The choice to focus on functional managers was deliberate, as they play a crucial role in their organizations' decision-making processes and strategic implementation. Their insights and experiences are valuable for understanding the dynamics of risk management practices within the industry. By targeting this specific group, the study aimed to gather comprehensive data on how risk management strategies are perceived and applied across different operational contexts, providing a nuanced understanding of their impact on project performance in the telecommunications sector.

3.4 Sample and Sampling Technique

The study employed a census technique, which involved engaging all respondents within the accessible population to reflect the entire population in the sample. This method entailed collecting data from every individual or unit within the population, as defined by Lavrakas (2008). Given the limited number of potential respondents within the Ghanaian telecommunications industry, the census approach was deemed the most suitable. By ensuring the inclusion of every functional manager from the accessible population, the study was able to capture a diverse range of perspectives and experiences across various sectors, including application service providers, network equipment suppliers, and software service providers. This comprehensive data collection aimed to enhance the validity and reliability of the findings, allowing for a more nuanced analysis of how risk management practices are perceived and implemented within the industry. The use of the census technique not only facilitated a thorough understanding of the current state of risk management but also helped to identify common challenges and best practices that could inform future strategies in the telecommunications sector.

3.5 Data Collection Instrument

The study utilized a structured questionnaire as the primary data collection tool, ensuring that all respondents were presented with uniform questions. The questionnaire was meticulously designed to gather comprehensive information pertinent to the study's objectives. The questionnaire assumed a 5-point Likert like scale, 1(least agreement), 2 (somewhat agree), 3 (moderately agree), 4 (agree) and 5 (strong agreement). It was divided into three distinct sections to systematically address the research questions. Section one of the questionnaire collected demographic information from the respondents, including their gender, age, educational background, years of experience in the industry. This section aimed to provide context to the responses and to identify any potential demographic factors that could influence the study's findings.

Section two examined project risk management strategies within the telecommunications industry, including risk assessment, risk control, and contingency planning. This section was designed to assess the current practices and perceptions regarding these strategies among the respondents. Section three explored the effect of the identified project risk management strategies on project performance within telecommunication firms in Ghana. This alignment allowed for a comprehensive analysis of how these strategies impact overall project outcomes. The questionnaires were designed to be self-administered, enabling respondents to complete them at their convenience. The researcher provided clear instructions and support to ensure that respondents understood how to accurately complete the questionnaire. This approach was instrumental in enhancing the reliability and validity of the collected data, ultimately supporting the robustness of the study's findings and allowing for a more nuanced understanding of the interplay between risk management practices and project performance in the telecommunications sector.

3.6 Data Collection Procedure

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A total of 130 questionnaires were distributed to functional managers at leading telecommunications companies, including MTN, Telecel, and AirtelTigo. The self-administered questionnaires were provided to respondents during their working hours, specifically from 8 AM to 4 PM, to facilitate completion. Despite some respondents encountering challenges that led to delays or incomplete submissions, the study successfully retrieved 113 filled questionnaires. This outcome reflects a robust response rate of 94%, indicating a high level of engagement and participation among the functional managers surveyed. The collected data is expected to provide valuable insights into the perspectives and experiences of professionals within the telecommunications sector.

3.7 Data Processing and Analysis

The responses collected from the questionnaires underwent a systematic coding and data entry process into the Statistical Package for the Social Sciences (SPSS) software version 25, facilitating comprehensive data processing and analysis. This meticulous approach ensured that the data was organized and accurate, setting the stage for subsequent statistical evaluation. For analyzing the demographic information, descriptive statistics, including frequencies and percentages, were utilized. These statistical tools provided a clear overview of the respondents' demographic characteristics, shedding light on the distribution of various variables such as gender, age, educational background, and years of industry experience. This initial analysis was essential for understanding the sample composition and identifying any demographic trends that could influence the study's findings.

In exploring the descriptive statistics related to project risk management strategies and project performance, measures such as the mean and standard deviation were employed. The mean served as an average value of the responses, indicating the central tendency for each variable, while the standard deviation highlighted the variability or dispersion of responses around the mean. This provided insights into the spread of the data. To address the study objectives and test the hypothesized relationships between project risk management and project performance, more advanced analytical techniques were implemented. Correlation analysis was conducted to assess the strength and direction of the relationships between the project risk management strategies and project performance, identifying whether positive or negative relationships existed and the degree of association between the variables.

Additionally, multiple regression analysis was employed to examine the predictive power of project risk management strategies on project performance. This technique enabled the researcher to understand the combined effects of various independent variables on the dependent variable. By utilizing multiple regression, the study quantified how specific project risk management strategies contributed to variations in project performance, offering detailed and actionable insights. Overall, the integration of descriptive statistics, correlation, and multiple regression analysis provided a comprehensive understanding of the data, enabling the researcher to draw meaningful conclusions about the impact of project risk management strategies on the performance of telecommunications firms in Ghana. This thorough analytical approach significantly enhanced the robustness and reliability of the study's findings.

3.8 Validity and Reliability

Validity and reliability, according to Pope, Bond, Morrison-Saunders, and Retief (2013), pertain to how data is collected or how an analysis is conducted to produce reliable results. According to Harper (2002), a questionnaire's validity and reliability are required for it to yield valuable results. The capacity of the questionnaire to test what it was meant for is referred to as validity, whilst the relevance of the questions is referred to as reliability (Pallant, 2013). Reliability was checked through a pre-test that was conducted among 30 functional managers in the telecommunication industry. A reliability analysis was run using the Cronbach Alpha Test. The result was presented in Table 1.

Table 1. Reliability Test

Variable	No. of Items	Cronbach's Alpha

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Risk assessment	6	.892
Risk control	6	.840
Contingency planning	6	.868
Project performance	6	.761

Source: Field data (2024)

The reliability test results presented in Table 1 indicate the internal consistency of various constructs measured in the study, as assessed by Cronbach's Alpha values. For risk assessment, the Cronbach's Alpha of 0.892 suggests a high level of reliability, indicating that the items effectively capture this construct. Similarly, risk control exhibits strong reliability with an Alpha value of 0.840, demonstrating that the items measuring this variable are consistent and trustworthy. Contingency planning also shows high reliability with a coefficient of 0.868, reinforcing the effectiveness of the items in measuring this aspect of project management. In contrast, project performance has a slightly lower Cronbach's Alpha of 0.761, which, while still reflecting acceptable reliability, suggests there may be room for improvement. Overall, these results indicate that the measures used for risk assessment, risk control, and contingency planning are highly reliable, while the project performance measure remains adequately reliable, making the study's findings credible for further analysis and interpretation.

On the other hand, the validity of the study was rigorously assessed through multiple methods, including peer review, expert review, and literature review, as outlined by Chandran (2004). Peer review involved having the research scrutinized by fellow scholars and professionals in the field, ensuring that the methodology and findings met established academic standards. The expert review further enhanced validity by incorporating insights from subject matter experts who provided feedback on the relevance and appropriateness of the constructs and measures used in the study. Additionally, the literature review allowed for a thorough examination of existing research, ensuring that the study was grounded in established theories and practices. This comprehensive approach to validating the research not only bolstered the credibility of the findings but also ensured that the constructs were accurately measured and relevant to the context of the telecommunications industry.

3.9 Ethical Considerations

According to Patten and Newhart (2017), the key ethical factors considered in this research included voluntary participation, the right to privacy, anonymity, and information confidentiality. To address each of these ethical concerns, every effort was made throughout the study. For instance, all respondents were allowed to actively participate in the data collection process of their own free will, ensuring that their involvement was both voluntary and informed. Informed consent was obtained from all participants, and measures were taken to guarantee their anonymity and the confidentiality of their responses. Additionally, all documents utilized for this research were meticulously cited, adhering to ethical standards to avoid any concerns related to plagiarism. These ethical considerations were integral to maintaining the integrity of the research and fostering trust between the researchers and the participants.

4.0 RESULTS AND DISCUSSION

This chapter provides a comprehensive presentation of the results and discussion in relation to the study's objectives. It begins with an overview of the demographic characteristics of the respondents, offering insight into the background and composition of the study participants. Next, the chapter delves into the descriptive statistics of the key variables, summarizing their distributions and key trends. Following this, the regression analysis is introduced, where the study objectives are rigorously examined through statistical testing. Finally, the chapter concludes with an in-depth discussion of the findings, linking the results to the relevant literature and highlighting the implications of the study.

4.1 Demographic Characteristics

This section presented the results on the demographics of the respondents. The result was presented in Table 2.

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Table 2. Demographic Characteristics

Demographic Variables	Categories	Frequencies	Percentages
Sex	Male	94	83.19
	Female	19	16.81
Total		**113**	**100**
Age	18-28	35	30.97
	29-39	56	49.56
	40-50	22	19.47
Total		**113**	**100**
	Bachelors	54	47.79
	Masters	59	52.21
Total		**113**	**100**

Source: Field data (2024)

The demographic characteristics in Table 2 provides an overview of the sample population, revealing key variables such as sex, age, and education level. In terms of sex distribution, the sample is predominantly male, with 94 participants representing 83.19% of the total, while females account for only 19 participants or 16.81%. This significant gender imbalance is notable. Regarding age distribution, the majority of participants, 56 individuals (49.56%), fall within the 29-39 age group, followed by the 18-28 age group, which includes 35 participants (30.97%). The 40-50 age group has the least representation, with 22 participants (19.47%). This suggests that the sample is concentrated in the younger adult demographic.

In terms of educational attainment, there is a relatively even split between participants holding bachelor's degrees (54 individuals, or 47.79%) and those with master's degrees (59 individuals, or 52.21%). Overall, the sample is characterized by a predominance of males, a strong representation of individuals in their late twenties to late thirties, and a relatively high level of educational achievement. These demographic factors are essential to consider when interpreting the findings of any related research.

4.2 Descriptive Statistics

The descriptive statistics for the study variables were presented in Table 3. Mean and standard deviation were the descriptive analytical tools.

Table 3. Descriptive Statistics

	N	Mean	Std. Deviation
	Statistic	Statistic	Statistic
Risk assessment	113	2.96	1.332
Risk control	113	3.70	1.105
Contingency planning	113	3.71	1.167
Project performance	113	3.72	1.084

Source: Field data (2024)

The descriptive statistics in Table 3 presents key insights into various dimensions of project management, including risk assessment, risk control, contingency planning, and project performance. Each of these dimensions is assessed across a sample of 113 participants. Starting with risk assessment, the mean score is 2.96, accompanied by a standard deviation of 1.332. This suggests that while the average perception of risk assessment is somewhat moderate, the relatively high standard deviation indicates considerable variability in responses. This variability may imply differing levels of confidence or experience among participants regarding their ability to assess risks effectively.

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In terms of risk control, the mean score increases to 3.70, with a standard deviation of 1.105. This higher average suggests that participants feel more positively about their ability to control risks compared to assessing them. The lower standard deviation in this dimension indicates a more consistent perception of risk control among respondents, suggesting that most participants share similar views on the effectiveness of their risk management practices.

Contingency planning shows a mean score of 3.71, with a standard deviation of 1.167. This score indicates that participants generally view contingency planning favourably, similar to risk control. The slight variability in responses, as reflected by the standard deviation, suggests that while many recognize the importance of contingency planning, some may have differing experiences or opinions about its execution. Finally, project performance has a mean score of 3.72, with a standard deviation of 1.084. This suggests that participants perceive project performance positively, indicating a strong overall sentiment toward the effectiveness of their projects. The relatively low standard deviation points to a consensus among participants regarding their project outcomes.

4.3 Effect of risk assessment on project performance

The first objective was to examine the effect of risk assessment on project performance of telecommunication firms in Ghana. It was hypothesized that risk assessment has a significant effect on project performance of telecommunication firms in Ghana. To achieve this objective, a simple regression was run and the results are presented in Tables 4, 5 and 6.

Table 4. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.499[a]	.249	.246	.49743

a. Predictors: (Constant), Risk Assessment

Source: Field data (2024)

The R-square value of 0.249 in Table 4 indicates that approximately 24.9% of the variation in project performance, the dependent variable, is explained by the model with Risk Assessment as the predictor. This suggests that Risk Assessment has a modest explanatory power in predicting project performance. The adjusted R-square value of 0.246 is slightly lower, reflecting a minor adjustment for the number of predictors in the model, which helps prevent overestimation of the model's explanatory capacity in a small sample. Overall, the model accounts for nearly a quarter of the variance in project performance, which highlights that while Risk Assessment plays a role in influencing project performance, there are likely other factors not included in this model that also impact performance outcomes. The standard error of 0.49743 further indicates the average deviation of the observed values from the predicted values, providing a measure of how well the model's predictions align with actual performance data.

Table 5. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.481	1	17.481	70.650	.000[b]
	Residual	52.703	213	.247		
	Total	70.184	214			

a. Dependent Variable: Project Performance
b. Predictors: (Constant), Risk Assessment

Source: Field data (2024)

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The ANOVA Table 5 reveals an F-statistic of 70.650 with a significance level (p-value) of .000, indicating a highly significant result. This F-statistic reflects the ratio of the variance explained by the model (Regression Sum of Squares) to the unexplained variance (Residual Sum of Squares), adjusted by their respective degrees of freedom. The large F-value suggests that the model, with Risk Assessment as the predictor, explains a significant portion of the variance in project performance relative to what would be expected by chance alone. Given the p-value is less than 0.05, we can conclude that the relationship between Risk Assessment and project performance is statistically significant, supporting the model's validity in predicting project performance based on Risk Assessment. This significance reinforces the importance of Risk Assessment as a meaningful predictor in the model.

Table 6. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.810	.160		11.289	.000
	Risk Assessment	.462	.055	.499	8.405	.000

a. Dependent Variable: Project Performance

Source: Field data (2024)

The coefficient Table 6 provides insight into the relationship between Risk Assessment and Project Performance. The unstandardized coefficient (B) for Risk Assessment is 0.462, which suggests that for each one-unit increase in Risk Assessment, Project Performance is expected to increase by 0.462 units, holding other factors constant. This positive coefficient indicates a direct relationship, meaning that higher risk assessment is associated with improved project performance. The standardized coefficient (Beta) of 0.499 implies that Risk Assessment has a moderate to strong influence on Project Performance relative to other potential variables, although in this model, Risk Assessment is the sole predictor. The t-value of 8.405 and the corresponding significance level of .000 indicate that the effect of Risk Assessment on Project Performance is highly statistically significant. This supports the conclusion that Risk Assessment is a meaningful and reliable predictor of Project Performance in this model. The constant (intercept) of 1.810 represents the baseline level of Project Performance when Risk Assessment is zero, although it may not hold practical significance in real-world scenarios.

4.4 Effect of risk control on project performance

The second objective of the study was to analyse the effect of risk control on the project performance of telecommunication firms in Ghana. It was hypothesized that risk control has a significant effect on the project performance of telecommunication firms in Ghana. To achieve this objective, a simple regression was run and the results are presented in Tables 7, 8 and 9.

Table 7. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.544[a]	.296	.292	.48172

a. Predictors: (Constant), Risk Control

Source: Field data (2024)

The R-square value of 0.296 in this model summary Table 7 indicates that approximately 29.6% of the variance in project performance, the dependent variable, is explained by Risk Control as the predictor. This value suggests that Risk Control has a moderate explanatory power in predicting project performance, accounting for nearly a third of the variability in project outcomes. This level of explanation implies that while Risk Control significantly contributes to project performance, there are likely additional factors not captured in this model that also influence performance.

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The adjusted R-square value of 0.292 is slightly lower than the R-square, which is typical, as it adjusts for the number of predictors in the model, providing a more conservative estimate. This minor decrease in the adjusted R-square indicates that the model's explanatory power is not substantially inflated by sampling variations and reinforces the robustness of Risk Control as a predictor. Overall, with both R-square and adjusted R-square values indicating close to 30% of variance explanation, this model demonstrates that Risk Control plays an essential role in project performance, although other influential factors may exist beyond this predictor. The standard error of 0.48172 further provides insight into the average deviation of actual project performance scores from the predicted values, highlighting the model's accuracy in estimating project performance outcomes.

Table 8. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.757	1	20.757	89.450	.000[b]
	Residual	49.427	213	.232		
	Total	70.184	214			

a. Dependent Variable: Project Performance
b. Predictors: (Constant), Risk Control
Source: Field data (2024)

The ANOVA Table 8 presents an F-statistic of 89.450 with a significance level (p-value) of .000, indicating that the model is highly significant. This F-statistic represents the ratio of the variance explained by the model (Regression Sum of Squares) to the unexplained variance (Residual Sum of Squares), accounting for their respective degrees of freedom. A high F-value, as seen here, suggests that the model, with Risk Control as the predictor, explains a considerable proportion of the variance in project performance beyond what could be attributed to random chance. The significance level of .000, well below the common threshold of 0.05, further confirms that the relationship between Risk Control and project performance is statistically significant. This finding supports the validity of the model and underscores the importance of Risk Control as a predictor in explaining project performance. Therefore, Risk Control can be considered a key factor in the model, contributing meaningfully to variations in project performance outcomes.

Table 9. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.811	.143		12.679	.000
	Risk Control	.447	.047	.544	9.458	.000

a. Dependent Variable: Project Performance
Source: Field data (2024)

The coefficients Table 9 provides insights into the relationship between Risk Control and Project Performance. The unstandardized coefficient (B) for Risk Control is 0.447, which indicates that for each one-unit increase in Risk Control, Project Performance is expected to increase by 0.447 units, assuming all other factors are constant. This positive coefficient demonstrates a direct relationship, implying that as Risk Control improves, project performance also tends to improve. The standardized coefficient (Beta) of 0.544 suggests a relatively strong influence of Risk Control on Project Performance in this model, as it explains a significant portion of the variability in project outcomes compared to other variables, although Risk Control is the sole predictor in this case.

The t-value of 9.458, along with the very low p-value of .000, indicates that the effect of Risk Control on Project Performance is highly statistically significant. This significance level strongly supports the reliability of Risk Control as an impactful predictor in the model. The constant (intercept) of 1.811 represents the baseline level of Project Performance when Risk

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Control is zero, though this may not hold practical meaning in real-world scenarios. Altogether, these results underscore the importance of effective Risk Control in enhancing project performance and confirm its significant role in the predictive model.

4.5 Effect of contingency planning on project performance

The last objective was to examine the effect of contingency planning on project performance of telecommunication firms in Ghana. It was hypothesized that contingency planning has a significant effect on project performance of telecommunication firms in Ghana. To achieve this objective, a simple regression was run and the results are presented in Table 10, 11 and 12.

Table 10. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.536[a]	.287	.284	.48454

a. Predictors: (Constant), Contingency Planning

Source: Field data (2024)

The R-square value of 0.287in Table 10 indicates that approximately 28.7% of the variation in the dependent variable is explained by the predictor, Contingency Planning. This suggests that while the predictor has some explanatory power, a significant portion of the variability in the dependent variable remains unexplained by this model. The adjusted R-square, which is slightly lower at 0.284, takes into account the number of predictors and adjusts for any potential overestimation of the R-square due to sample size. This small reduction reflects the model's true explanatory power more accurately, especially in smaller samples, as it penalizes for adding predictors that don't significantly improve the model's fit. Overall, both R-square and adjusted R-square values indicate a modest but meaningful relationship between Contingency Planning and the dependent variable.

Table 11. ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	20.175	1	20.175	85.932	.000[b]
	Residual	50.009	213	.235		
	Total	70.184	214			

a. Dependent Variable: Project Performance
b. Predictors: (Constant), Contingency Planning

Source: Field data (2024)

The ANOVA results for this model in Table 11 show an F statistic of 85.932 with a significance level (p-value) of 0.000. The F statistic tests the overall significance of the model, essentially evaluating whether the predictor variable, Contingency Planning, provides a statistically significant explanation for the variance in Project Performance. Given the high F value and the significance level of 0.000 (which is below the standard threshold of 0.05), we can conclude that the model is statistically significant. This indicates that Contingency Planning is a significant predictor of Project Performance, meaning it explains a meaningful portion of the variance in the dependent variable.

Table 12. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.811	.146		12.437	.000
	Contingency Planning	.444	.048	.536	9.270	.000

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a. Dependent Variable: Project Performance

Source: Field data (2024)

The coefficient Table 12 provides insight into the relationship between Contingency Planning and Project Performance. The unstandardized coefficient (B) for Contingency Planning is 0.444, with a standard error of 0.048. This indicates that for each one-unit increase in Contingency Planning, Project Performance is expected to increase by 0.444 units, assuming all else remains constant. The standardized coefficient (Beta) of 0.536 suggests that Contingency Planning has a moderate to strong positive effect on Project Performance in standardized terms. This Beta value implies that a one-standard-deviation increase in Contingency Planning is associated with a 0.536 standard deviation increase in Project Performance. The t-value of 9.270 and the significance level (p-value) of 0.000 confirm that the effect of Contingency Planning on Project Performance is statistically significant. This strong significance level (below 0.05) suggests that the positive relationship observed between Contingency Planning and Project Performance is unlikely to be due to chance, reinforcing the predictor's importance in explaining the dependent variable.

4.7 Discussion

The discussion was done for each of the findings of the study objectives.

4.7.1 Effect of risk assessment on project performance

The finding that risk assessment has a significant positive effect on project performance in telecommunication firms means that when these firms actively engage in assessing risks, such as identifying potential obstacles, evaluating their impact, and preparing strategies to manage them, they tend to achieve better outcomes in their projects. This improvement in project performance may manifest in various ways, such as meeting deadlines, staying within budget, achieving project goals, and delivering quality outcomes. In essence, the finding suggests that effective risk assessment allows telecommunication firms to foresee and manage potential challenges before they become issues, thereby enabling smoother project execution and enhancing overall project success. This relationship highlights that risk management isn't just a preventive measure but an integral contributor to the positive performance and success of projects within the industry.

This finding is consistent with the results of studies by Akintunde and Morel (2023), Kurniawan and Rahman (2020), Mutunga and Ondara (2021), Sanni-Anibire *et al.* (2020), and Erfani *et al.* (2023), which suggest a more direct link between risk assessment and improved project performance. This discrepancy may warrant further investigation into the specific contexts and methodologies employed in these studies to understand the differing outcomes. It raises important questions about the conditions under which risk assessment may be effective and the potential factors that could influence its impact on project success. By addressing these questions, organizations can refine their risk management approaches, ensuring that they not only assess risks but also leverage that information effectively to drive project performance.

4.7.2 Effect of risk control on project performance

The finding that risk control significantly and positively contributes to project performance highlights its critical role in successful project management. This suggests that organizations should prioritize and strengthen their risk control practices, as effective risk management can lead to improved project outcomes. By implementing robust risk control strategies, organizations can proactively address potential issues, mitigate threats, and capitalize on opportunities, thereby enhancing overall project performance. This proactive approach not only fosters a culture of preparedness but also increases stakeholder confidence in project execution. Additionally, this finding underscores the need for continuous training and development in risk control techniques, ensuring that project teams are equipped with the necessary skills to manage risks effectively.

Ultimately, emphasizing risk control can lead to more resilient and successful projects, aligning with organizational goals and increasing the likelihood of achieving desired results. This

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finding aligns with the results of Ouma, Sang, and Kinoti (2020), Rahman and Adnan (2020), Su and Khallaf (2022), Adafin, Rotimi, and Wilkinson (2021), Obondi (2022), and Mutunga and Ondara (2021), which collectively underscore the importance of risk control in enhancing project performance. The consistency across these studies reinforces the argument that effective risk control practices are essential for navigating the complexities of project management and achieving positive outcomes, suggesting that organizations should adopt and refine these practices as part of their strategic initiatives.

4.7.2 Effect of contingency planning on project performance

The finding that contingency planning significantly and positively contributes to project performance underscores its importance as a proactive strategy in project management. This suggests that organizations should prioritize the development and implementation of comprehensive contingency plans to effectively prepare for unexpected events and challenges. By having well-defined plans in place, teams can respond quickly to potential disruptions, minimizing their impact on project timelines and outcomes. This proactive approach not only enhances project resilience but also fosters a culture of preparedness and adaptability within the organization, enabling teams to navigate uncertainties with greater confidence.

Furthermore, the emphasis on contingency planning indicates the need for ongoing training and resources to ensure that project teams can effectively devise and execute these plans. This continuous development ensures that team members are well-equipped to handle unexpected situations, ultimately contributing to smoother project execution. Focusing on contingency planning can lead to improved project performance, increased stakeholder confidence, and a greater likelihood of achieving project goals. This finding is consistent with the outcomes of Hoseini *et al.* (2020), Persson and Granberg (2021), Maniar (2020), Chaib Lababidi *et al.* (2020), Hoseini, Bosch-Rekveldt, and Hertogh (2020), and Jariwala (2024), all of which highlight the critical role of contingency planning in driving successful project outcomes. The consistency across these studies reinforces the argument that effective contingency planning is essential for navigating complexities in project management and achieving desired results.

The finding that risk assessment has a significant positive effect on project performance in telecommunication firms means that when these firms actively engage in assessing risks, such as identifying potential obstacles, evaluating their impact, and preparing strategies to manage them, they tend to achieve better outcomes in their projects. This improvement in project performance may manifest in various ways, such as meeting deadlines, staying within budget, achieving project goals, and delivering quality outcomes. In essence, the finding suggests that effective risk assessment allows telecommunication firms to foresee and manage potential challenges before they become issues, thereby enabling smoother project execution and enhancing overall project success. This relationship highlights that risk management isn't just a preventive measure but an integral contributor to the positive performance and success of projects within the industry.

5.0 CONCLUSIONS

The chapter covered the summary of the study, conclusions and recommendations.

5.1 Summary of the Study

The study examines the effect of project risk management strategies on the project performance in the telecommunication industry of Ghana. Specifically, the study examined the effect of risk assessment on project performance among the telecommunication firms, analysed the effect of risk control on project performance among the telecommunication firms, and assessed the effect of contingency planning on project performance among the telecommunication firms. The study was underpinned by the resource-based view. The study was purely quantitative and the design was explanatory. Data was collected from 113 functional managers from the telecommunication industry of Ghana. The analysis was done using multiple regression on SPSS version 25.

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5.2 Summary of Key Findings

The study found that risk assessment, risk control, and contingency planning each have a significant positive effect on the project performance of telecommunication firms. These findings highlight the critical role of comprehensive risk management practices in enhancing project success within the telecommunication sector. By systematically identifying and evaluating potential risks, firms can proactively address challenges, while effective risk control ensures that these risks are managed and mitigated throughout the project lifecycle. Additionally, contingency planning equips firms with strategies to handle unforeseen events, further strengthening their ability to deliver successful projects. Collectively, these practices contribute to improved project outcomes, emphasizing the importance of an integrated approach to risk management in the telecommunication industry.

5.3 Conclusions

The study concludes that risk assessment plays a crucial role in improving project performance in telecommunication firms. By identifying and evaluating potential risks early in the project lifecycle, firms can anticipate challenges and develop effective mitigation strategies. This proactive approach contributes to smoother project execution and enhances the likelihood of achieving project objectives.

The study concludes that effective risk control significantly enhances project performance in telecommunication firms. Implementing measures to monitor, manage, and mitigate identified risks during project execution ensures that disruptions are minimized, enabling projects to stay on track in terms of time, cost, and quality.

The study concludes that contingency planning is a vital component of successful project performance in telecommunication firms. Preparing for unexpected events by having alternative strategies in place allows firms to respond quickly and efficiently to challenges, ensuring continuity and minimizing the impact of unforeseen disruptions on project outcomes.

5.4 Recommendations

Based on the conclusions drawn from the study, several recommendations can be made in relation to policy, practice, and theory. From a policy perspective, it is crucial for organizations in the telecommunications industry in Ghana to reassess their risk management frameworks. Policymakers should advocate for guidelines that emphasize the integration of effective risk control and contingency planning into project management practices. This may involve establishing standards that prioritize these components, encouraging organizations to allocate resources toward developing robust strategies. By implementing policies that support a proactive approach to risk management, organizations can better navigate the complexities of the industry and enhance overall project performance.

In terms of practice, functional managers in the telecommunications sector should prioritize the development and implementation of risk control measures and contingency plans. This involves conducting regular training sessions to equip teams with the necessary skills to identify and mitigate risks effectively. Managers should foster a culture of preparedness by encouraging open communication about potential risks and ensuring that contingency plans are well-documented and accessible. By integrating these practices into daily operations, organizations can enhance their resilience and responsiveness to challenges, ultimately leading to improved project outcomes.

Theoretically, the findings align with the resource-based view (RBV), which emphasizes the importance of leveraging organizational resources for competitive advantage. To align with this perspective, organizations should focus on developing their internal capabilities related to risk control and contingency planning. This may involve investing in specialized training, adopting advanced technologies for risk management, and fostering a culture that values proactive problem-solving. By viewing risk management as a critical resource that can drive project performance, organizations can better position themselves in the competitive telecommunications landscape in Ghana.

5.5 Suggestions for Further Studies

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First, future studies could explore the specific components of risk assessment that may influence project performance, despite the current study's finding of no significant contribution. Understanding the nuances within risk assessment practices could help identify potential areas for improvement and highlight effective methods that may have been overlooked. Second, research could expand the scope to include qualitative methods, such as interviews or focus groups with functional managers in the telecommunications industry. This approach could provide deeper insights into the challenges and best practices associated with risk management strategies, complementing the quantitative data collected in the current study.

Third, future studies might investigate the relationship between organizational culture and the effectiveness of risk management strategies. Understanding how different cultural contexts within telecommunication firms affect the implementation and outcomes of risk control and contingency planning could yield valuable insights for practitioners. Additionally, comparative studies could be conducted across different industries to evaluate how project risk management strategies impact performance in various contexts. Such research could provide broader generalizability and highlight industry-specific factors that influence the effectiveness of risk management.

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